In the Claims

1. (Currently Amended) A transmitter for generating first and second modulation signals in response to first and second input data symbols in a communication system, said transmitter comprising:

a transmitter memory for storing a code sequence;

a first circular shifting means for circular-shifting said code sequence by a first circular-shift, an amount of said first circular-shift being determined by a value of said first data symbol, said first shifting means being coupled to said transmitter memory and generating a first encoded sequence; and

a second circular shifting means for reversing said code sequence and circular-shifting said reversed code sequence by a second circular-shift, an amount of said second circular-shift being determined by a value of said second data symbol, said second shifting means being coupled to said transmitter memory and generating a second encoded sequence.

2. (Original) A transmitter in accordance with claim 1, further comprising a quadrature modulator for generating transmitted modulated signal in response to said first and second modulation signals.

3. (Original) A transmitter in accordance with claim 1, further comprising:

a radio frequency signal generator for generating a in-phase radio frequency signal;

a phase-shifter coupled to said radio frequency signal generator for phase shifting said in-phase radio frequency signal and producing a quadrature radio frequency signal;

a first multiplier for multiplying said in-phase radio frequency signal and said first modulation signal to produce an in-phase signal component;

a second multiplier for multiplying said quadrature radio frequency signal and said second modulation signal to produce a quadrature signal component; and

a summer for summing said in-phase signal component with said quadrature signal component to produce an output signal.

4. (Original) A transmitter in accordance with claim 1 further comprising a means for converting an input bit-stream into a sequence of first and second input data symbols and said receiver further comprises a means for converting said first and second output data symbols into an output chip-stream.

5. (Previously Amended) A transmitter in accordance with claim 1, wherein said code sequence comprises M-chips, and said transmitter memory comprises an M-chip shift register for circular shifting said code sequence.

6. (Original) A transmitter in accordance with claim 1, further comprising first and second pulse shapers for converting said first and second encoded sequences into said first and second modulation signals.

Claims 7-10 have been canceled.

11. (Currently Amended) A communication system, comprising:

a transmitter for generating first and second modulation signals in response to first and second input data symbols, said transmitter comprising:

a transmitter memory for storing a code sequence;

a first circular shifting means for circular-shifting said code sequence by a first circular-shift, an amount of said first circular-shift being determined by a value of said first data symbol, said first shifting means being coupled to said transmitter memory and generating a first encoded sequence;

a second circular shifting means for reversing said code sequence and circular-shifting said reversed code sequence by a second circular-shift, an amount of said second circular-shift being determined by a value of said second data symbol, said second shifting means being coupled to said transmitter memory and generating a second encoded sequence;

a receiver for decoding a complex modulated signal, said receiver comprising:

a receiver memory for storing a code sequence;

a first correlator coupled to said receiver memory for determining the correlation between a circular-shifted version of said code sequence and said complex modulated signal; and

a second correlator coupled to said receiver memory for determining the correlation between a circular-shifted and time-reversed version of said code sequence and said complex modulated signal.

12. (Currently Amended) A communication transmitter for generating first and second modulation signals in response to first and second input data symbols, said transmitter comprising:

a transmitter memory for storing a code sequence;

a circular-shifting means for circular-shifting said code sequence by a circular-shift, an amount of said circular-shift being determined by a value of said first or second data symbol, said shifting means being coupled to said transmitter memory and generating an encoded sequence corresponding to said first or second data symbol;

a bi-directional register operable to store said encoded sequence allowing the sequence to be read in either a forward or a reverse direction, said bi-directional register having first and second read directions; and

a selector operable to select said first or second read directions according to whether said encoded sequence corresponds to said first or second data symbol;

wherein said first modulation signal is generated when said first read direction is selected and said second modulation signal is generated when said second read direction is selected.

Claim 13 has been cancelled.

14. (Currently Amended) A method for encoding first and second input data symbols, each input data symbol having one of N values, said method comprising:

storing a pseudo-noise code sequence in a memory;

circular-shifting said pseudo-noise code sequence by an amount determined by a value of the first input symbol to obtain M chips of an in-phase encoded digital signal; and

circular-shifting the time-reversal of said pseudo-noise code sequence by an amount determined by a value of the second input symbol to obtain M chips of a quadrature encoded digital signal.

15. (Previously Amended) A method in accordance with claim 14, further comprising:

converting said in-phase and quadrature encoded digital signals into in-phase and quadrature signals;

modulating an in-phase component of a carrier signal by said in-phase signal;

modulating a quadrature component of a carrier signal by said quadrature signal; and

summing said in-phase and quadrature components of the carrier signal to produce a modulated signal.

16. (Original) A method in accordance with claim 14, further comprising converting an input bit-stream into said first and second input data symbols.

Claims 17-20 have been cancelled.